VIA UPS

Mr. David Keith
Project Coordinator
Anchor QEA, LLC
614 Magnolia Avenue
Ocean Springs, MS 39654

RE: Draft Remedial Alternatives Memorandum
San Jacinto River Waste Pits Superfund Site, Harris County, Texas
Unilateral Administrative Order, CERCLA Docket No. 06-03-10

Dear Mr. Keith:

The Environmental Protection Agency (EPA) and other agencies have performed reviews of the above referenced document dated January 2012. The enclosed comments shall be incorporated in the Final Remedial Alternatives Memorandum and copies provided for review and approval in accordance with the approved schedule.

If you have any questions, please contact me at (214) 665-8318, or send an e-mail message to miller.garyg@epa.gov.

Sincerely yours,

Gary Miller
Remediation Project Manager

Enclosure

cc: Luda Voskov (TCEQ)
Bob Allen (Harris County)
Nicole Hausler (Port of Houston)
Jessica White (NOAA)

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Comments
Draft Remedial Alternatives Memorandum (RAM) dated January 2012

1. **(Section 1.1, p. 1):** The RAM comprises the preliminary screening of potential remedial alternatives for the site. Typically, potential remedial alternatives are identified by their capacity to address the response action objectives (RAOs) based on remedial action levels (RALs) at a site. However, the specific RAOs (necessary to technology evaluations) are subject to the results of the Remedial Investigation Report and additional and/or modified alternatives may be necessary in the Feasibility Study.

2. **(Section 1.4, p. 4):** This section **r**efers to remedies in the site perimeter area, but the remedy may go beyond this perimeter. The memorandum shall include the possibility of remediating beyond the depicted site perimeter as appropriate based on risk.

3. **(Section 1.4, p. 6):** The RAM states that it is not anticipated that decisions to eliminate certain remedial technologies will need to be revisited during the Feasibility Study (FS). The RAM shall clarify this to also include that additional information (Southern Impoundment sampling results, or other information) may warrant the inclusion of such technologies.

4. **(Section 2.1.2.1, p. 8):** Reference is made to current uses, citing a depth of 12 ft, but uses by shoreline developments, construction and maintenance work, and the Port of Houston Authority (PHA) development plans may require remedial planning for deeper depths in the future. The memorandum shall incorporate this possibility.

5. **(Section 2.2.1, p. 10):** The navigation section shall address the probable future navigational needs for the area, as the River uses change and river front property is redeveloped.

6. **(Section 2.2.4, p. 15):** Reference to PHA regulation of uses "as it sees fit" shall be revised to say, "consistent with its authority and responsibilities."

7. **(Section 2.2.5, p. 15):** This section includes a discussion of access. A map extending at least one mile upstream and one mile downstream from the site perimeter shall be included to show shoreline access locations (including those presently fenced) where public, private or trespassers may access the shoreline.

8. **(Section 2.4.1, p. 25):** Based on these facts ("strong winds from the north can cause water to be transported out of the Galveston Bay system, which can result in water levels that are much lower than low tide elevations"), this section shall acknowledge that the risk assessment will consider that under north wind conditions, persons accessing the shoreline may be exposed to sediment that is normally under deeper water.

9. **(Section 2.4.2, p. 27):** When considering erosion, respondents shall include an analysis of (1) subsidence, (2) sea level rise, and (3) the potential for the channel to meander. The

current navigation channel is self maintaining, and the vessels use the existing channel thalweg. However, there is potential for this channel to migrate in the future.

10. **(Section 2.4.3, p. 27):** The long-term sedimentation estimates shall take into consideration the limited sediment sources due to upstream dam and items listed in previous comment. Land use restrictions, discharge limitations, storm water permitting and other regulatory developments may reduce future sediment loads to the River, and, therefore, the possibility of sedimentation mitigating the risks of contaminated sediments.

11. **(Section 3.2, p. 31**): The Remedial Action Objective (RAO) 1 shall be modified to include the entire site, including the area south of 1-10.

12. **(Section 3.3, p. 33):** An additional RAO shall be included for upland areas affected by site wastes to appropriate cleanup levels to reduce human exposures to site wastes from direct contact with soils, contingent on the results from the Human Health Risk Assessment.

13. **(Section 3.3, p. 33):** The report states that sediment remediation will be required for a lifetime excess cancer risk greater than 10^{-4}. While this cancer risk is at the high risk end of the EPA's 10^{-4} to 10^{-6} protective risk range, the Record of Decision (ROD) will select the RAOs and the risk level for remediation based on the risk assessments, ARARs, public comment, etc. The report shall modify the text to clarify that the ROD will select the final remediation approach to achieve a protective risk within the 10^{-4} to 10^{-6} risk range.

14. **(Section 3.4.1, p. 34):** Samples from 6 inches alone are not sufficient for surface chemistry data. At many locations the 0-1 ft sample far exceeds the concentration in the 0-6 in sample. This indicates that the 6 in sample may not be representative, or at least, there are only 6 in of less contaminated cover over more contaminated sediment. This is not sufficient to protect against exposure of burrowing biota, or after sediment disturbance, or exposure of humans accessing the area. The surface chemistry shall be based on the 0-1 ft data.

15. **(Section 3.4.3, p. 35):** The methodology comprising the determination of surface weighted average concentrations (SWACs), per Equation 3-1, effectively averages sediment concentrations on an area-wide scale. Such a method will tend to obscure specific wildlife exposure areas and/or hot spots that may invoke separate Remedial Action levels (RALs). The report shall discuss these areas in regards to the SWAC approach. The results may preclude the use of SWACs on a site-wide basis.

16. **(Section 3.4.3, p.36):** Figure 3-2 shows the curve from the condition prior to the TCRA. A second curve shall be provided to include SWACs from the present condition with the cap in place, down to the RAL. That graphic would more clearly illustrate the incremental benefit of each lower RAL from the current condition with the cap in place. This second curve shall also be discussed in this section.

17. **(Section 3.6, p. 38):** While a 100 year storm design basis sounds conservative, when accumulated over the long term, there is likelihood it will be exceeded. According to the

National Transportation Safety Board (PB96-917004, NTSB/SIR-96/04): "Between October 14 and October 21, 1994, the remnants of Hurricane Rosa caused heavy rainfall in a 38-county area of southeast Texas… The flooding caused major soil erosion in the flood plain and river channel, including the creation of water channels outside the San Jacinto River bed. The flood waters scoured the riverbed and banks, destabilized roads and bridges, and inundated area homes. The largest new channel (approximately 510 feet wide and 15 feet deep) was created when the river cut through the Banana Bend oxbow just west of the Rio Villa Park subdivision. A second major channel cut through Banana Bend just north of the channel through the oxbow… Historical peak stream flows were exceeded at 23 of the 43 stations monitored in the area. The 100-yearflood, which is defined as the peak stream flow having a 1 percent chance of being equaled or exceeded in any given year, was equaled at 1 and exceeded at 18 of 43 stations. For those stations where the 100-year-flood was exceeded, the flood was from 1.1 to 2.9 times the 100-year-flood." The design storm basis shall be more conservative and shall consider the effects of a flood equal to 2.9 times the 100-year flood.

18. **(Section 4.2.1, p. 45):** The reference to Table 4-1 shall also include a page number to clarify that it is not located with the other tables at the end of the report.

19. **(Table 4-2, p. 46):** The title of this table is "Critical Site Restrictions"; however, the title for the second column is "Use, Habitat, and Water Depth Considerations." Some of the items in the table may restrict certain actions at the site, such as water depth, structures, etc., while for others it is not clear how it would be a restriction for the site: recreational fishing for example. While the presence of the TCRA cap would impact any future construction to access the contaminated material, it could be accomplished if necessary to meet the requirements for a remedy, such as long term effectiveness for example. This table shall be revised to clearly identify the site conditions that would be expected to have a significant impact on construction activities. Any use or other condition that would not impact construction may be addressed elsewhere. Finally, the presence of the TCRA cap shall not be considered a critical site restriction for any construction activity. Rather, it should be addressed in light of the evaluation criteria as any other remedial technology would be.

20. **(Table 4-2, p. 46):** The table states that the TCRA cap has effectively contained the waste material. This statement shall be modified in light of the recent armor cap erosion and bulging of the underlying geotextile liner material following a relatively minor flood event, which create uncertainty regarding the effectiveness of the cap as it is currently designed and/or constructed.

21. **(Table 4-2, p. 46):** The report shall be revised to reflect that the San Jacinto River is not a federal authorized channel. It is a self-maintaining channel with limiting depths of approximately 13ft. It does not have deep draft vessels calling on the local industry.

22. **(Section 4.3, p. 47):** This section concludes that the only alternatives considered for the TCRA site are no further action and institutional controls. The cap over the waste pits is only one of the possible construction remedies for the waste pits, and the Record of Decision will select the final remedy after consideration of appropriate alternatives,

attainment of ARARs, public comment, etc. The second paragraph on page 47 shall be deleted, and a full range of remedial technologies for the waste pits area shall be included here and in other appropriate sections of this report.

23. **(Section 4.4.1.2, p. 49):** The report shall note that institutional controls are not effective if they are not enforced or are ignored.

24. **(Footnote 9, p. 47):** The EPA has adopted the reference dose (RfD) of 0.7 pg/mg-day. This footnote shall be modified accordingly.

25. **(Section 4.4.2.1, p. 51):** The report shall note that Enhanced Monitored Natural Recovery (EMNR) with sediment cover must meet the same ARARs as the capping alternatives. Also, the report shall note that MNR is not effective in the short term as it waits for time to dilute/cover the contaminated sediment.

26. **(Section 4.4.2.2, p. 52):** The report shall note, as stated in the Fate and Transport Model Study, that net sedimentation rates (NSR) are highly variable among locations and depend on season, fresh and tidal flow rates, prop disturbance and other factors. Sediment erosion is likely to occur in some areas. The current NSR model does not appear to take this variable into consideration. It also does not consider as a variable that the sediment deposited might contain dioxins and furans from the site itself, or from the other upstream sources, i.e. contaminant mass loading from lateral sources. The memo shall discuss the impact of these factors in relation to the effectiveness of MNR and EMNR.

27. **(Section 4.4.2.3, p. 54):** The conceptual monitoring plan shall also include sediment sampling after any major storm event that is likely to alter the sediment distribution of the estuary near the Site.

28. **(Section 4.4.2.4, p. 55):** The report shall note the initial effectiveness of Monitored Natural Recovery (MNR) is low as its waits for time to contain or reduce the bioavailability or toxicity of contaminants in sediment.

29. **(Table 4-4, p. 55):** It is not clear that the discussion of MNR and EMNR in the proceeding paragraphs substantiates the rating of "High Effectiveness" for sedimentation or placement of a thin layer of clean cover. There is a potential for scouring, particularly given the initial estimate of 1.5 cm/yr for the upper bound of sedimentation rate for the site. A rigorous assessment of natural sedimentation as the primary MNR mechanism, and generally the efficacy of a thin "clean" layer of cover as they may be impacted by scouring shall be completed as part of the FS.

30. **(Section 4.4.4.3, p. 65):** The report shall include a discussion regarding turbidity generated during the mixing/auguring process.

31. **(Section 4.4.4.4, p. 65):** The discussion of erosive forces shall also include anchoring and vessel grounding.

32. **(Section 4.4.5.2.1, p. 70)**: Regarding the discussion of the treatment or process train, the future FS shall check on available Best Management Practices to determine whether collection and treatment of water generated from passive dewatering on the barge is appropriate prior to discharge of water.

33. **(Section 4.4.5.2.2, p. 71):** The memo shall discuss high-efficiency, high-capacity, limited operating footprint dewatering systems. This type of process may be appropriate for the site given the apparent limitations of on-site space available for cleanup operations. An excerpt of the basic assessment of Genesis' "Joshua" process is provided as follows:

> "A vendor called Genesis Fluid Solutions (http://genesisfluidsolutions.com/) claims a high-speed sediment dewatering system, presumably to provide dewatered sediments to BioTech Restorations or another technology/vendor for ex situ treatment or transport to a permitted landfill for disposal. An earlier version of this system, when it was known as the Solomon process, was used to dewatering primary settling basin solids for a paper plant. The newer Joshua system replaces the belt filter press from the early configuration. From the unit's dewatering capacity data on the vendor website, it appears that equipped with 2 or 3 "pods" (modular inclined screen units), the unit would be able to handle the discharge from an 8 inch dredge. Based on back of the envelope calculations, assuming about 90% fines, and 20 hrs/day operation, the unit would dewater 150,000 cubic yards in 90 days. Dewatering unit operability/reliability would be a consideration if this unit were used to allow for faster dredging; unanticipated dewatering unit downtime for maintenance would cause idle time for the dredge.
>
> The U.S. Army Corps of Engineers (USACE) previously developed dewatering process fact sheets, found at http://el.erdc.usace.army.mil/elpubs/pdf/doert7.pdf
>
> USACE indicated most of the operational and cost information came from the various vendors; some may be on the optimistic side, but USACE tried to capture realistic ranges. The Solomon process reported a minimal cost (assuming all factors optimum) of $25/dry ton. For the case study cited, the Solomon costs were closer to $80/dry ton, including dredging and polymer. Reportedly polymer requirements can greatly influence costs, and therefore the character of the sediment dredged will be important in this regard. Production rates are in line with the low end of the Genesis capacity, but the process should be scalable with the addition of more inclined screens, up to the limiting capacity of the other components. The hydro-cyclones are a new addition, which would likely address one of the issues observed, where coarse material passed through the screens rather than over them, in the Portland operation. Apparently the Solomon process had problems in a follow-on project due to the material being quite different in composition from the characterization data. The new Joshua configuration may be more robust relative the different composition issue."

34. **(Section 4.4.5.2.2, p. 72):** The report shall note that the Port of Houston Authority (PHA) maintains the Lost Lake site and has specific requirements for sediment quality that includes other chemicals of concern that must be tested for and accepted by PHA. The PHA's

current position is that it will not accept any materials from the original footprint area of the San Jacinto River Waste Pits site into its dredge disposal sites.

35. **(Section 4.4.5.2.2, p. 72**): The report shall note that the "Permit Pre-Conditions and Conditions Process" protocol may be revised in the future.

36. **(Section 4.4.5.3, p. 73):** The report shall note that current channel depths are self-maintaining and that maintenance dredging is not conducted to provide depths within the channel.

37. **(Section 4.4.5.5, p. 75):** According to the PHA, the Lost Lake placement area is designated for navigation projects and not sediment remediation; and is therefore a poor example for estimated costs.

38. **(Section 4.4.5.5, p. 75)**: The memo shall provide a calculation of the estimated dredging costs per acre so there is a straight forward way to compare it against other alternatives (e.g., capping) that are presented only by $/acre. Table 4-2 of Appendix A provides this type of comparison; this table (or a variant) shall be provided in the main body of the report.

39. **(Section 4.4.6, p. 75):** The memo shall provide more detail regarding the technologies that were ruled out.

40. **(Section 4.4.6.1.1, p. 76):** The memo shall note that incineration would likely be preceded by a de-watering process.

41. **(Table 4-8, p. 81):** The memo shall clarify why off-site incineration is screened as only moderate implementability, particularly since on-site dewatering may be quite feasible given the purported space limitation at the site plus the apparent availability of at least one permitted incineration Treatment Storage and/or Disposal Facility (TSDF) in the area (Clean Harbors, located in Deer Park, TX ; note that the facility identified in the report (Veolia in Port Arthur, TX as listed in Section 4.4.6.5) may not be able to incinerate site wastes given a note on Veolia's website that dioxin containing waste incineration at its facility are prohibited or limited by permit).

42. **(Table 4-8, p. 81):** It is not clear that ex-situ thermal desorption should be eliminated from further consideration. In one case, In Pile Thermal Desorption (IPTD) vendor TerraTherm identified approximately 6 acres as the operations footprint for a full-scale IPTD facility to efficiently treat dioxin/furan contaminated soil and sediment. The 6 acres cited by TerraTherm may be the most efficient facility size but it may be possible to establish fewer treatment cells to reduce footprint requirements, noting this may reduce the treatment throughput and potentially increase the per cubic yard treatment cost due to a commensurate reduction in the economy of scale. Additionally, it is likely a reasonable assumption that establishing an off-site location for employing IPTD is not feasible given the need to obtain actual permits to establish a Resource Conservation and Recovery Act (RCRA) TSDF; if a facility is established within the Superfund site only meeting the substantive requirements of

the permits would be required. The memo shall re-assess the use of this technology in light of the General Comment #62 below regarding upland areas within the site boundary.

43. **(Section 4.5.1.4, p. 84, and other places):** The report states that the Lost Lake sediment management area could be utilized for disposal of material with TEQ_{DF} concentrations that are less than 1000 ppt if approved by the PHA and USACE. However, according to the PHA, the Lost Lake placement area is designated for navigation projects and not sediment remediation.

44. **(Section 4.5.2.3, p. 87):** The report states that the Lost Lake sediment management area is already approved to accept most sediment that might be removed from the Site. However, according to the PHA, sediments are not approved to be placed in Lost Lake placement area. It is managed by the PHA, and the PHA's current position is that it will not accept any materials from the original footprint area of the SJRWP into its dredge disposal sites.

45. **(Section 4.5.2.4, p. 87):** The report provides an estimated unit cost for transportation and upland disposal at a commercial landfill of $80-100/ton, which appears excessive. The report shall include a discussion of the basis for this cost estimate.

46. **(Section 4.5.2.5, p. 88):** The report states that the waste acceptance criteria developed for the Lost Lake facility determined that sediments such as those that may be removed from the Site can be effectively contained in the facility. However, according to the PHA, there is an extensive analytical list of chemicals that must be evaluated prior to acceptance into one of its sites, and further, that it is not clear from the data available at this point that the sediments associated with the Site would be acceptable to the PHA.

47. **(Section 4.5.2.6, p. 88):** The report states that the disposal site owner would be responsible for long-term maintenance and monitoring of the facility. However, according to the PHA, Lost Lake currently does not have a monitoring program for contaminated material, and that it should not be assumed the PHA would accept responsibility for these sediments. The PHA's current position is that it will not accept any materials from the original footprint area of the San Jacinto River Waste Pits site into its dredge disposal sites.

48. **(Section 4.5.3, p. 89):** Beneficial use is ruled out because it would not meet "criteria" but the criteria are not defined. The memo shall include a description of the criteria. Further, the “BioGenesis” technology for beneficial use shall be considered.

49. **(Section 4.6, p. 91):** The report notes that dry excavation will be addressed in additional detail the FS (Section 4.4.5.1). In Section 4.6, Table 4-10, dry excavation is not retained. The report shall be revised to retain dry excavation as a potential technology.

50. **(Section 5.1.2, p. 93):** Institutional controls shall be combined with monitored natural recovery (MNR) and enhanced MNR (EMNR); and with containment capping. Also, solidification/stabilization shall be included as a part of the treatment alternatives.

51. **(Section 5.1.2, p. 94):** In shallow areas, even a thin cap may alter the flood elevations and current velocities in the remaining cross section. The use thin caps as well as thick caps over broad areas shall be evaluated relative to net changes in the floodplain and potential resulting impacts to flood elevations.

52. **(Section 5.1.3, p. 94):** Areas addressed within the FS may require adjustment based on the outcome of the risk assessments and the Fate and Transport Model Study.

53. **(Section 5.1.5.1, p. 98):** The report states that "MNR is a technology that is applicable for all areas of the Site and is not constrained by SMA type." MNR of dioxins and furans is described as a natural process that occurs when clean sediment particles are deposited over contaminated materials within the Site (Section 4.4.2.1). Portions of the river are not depositional, and MNR that relies on deposition would not be feasible for these areas. The report shall be revised to clarify this.

54. **(Section 5.1.5.2, p. 100):** The report states that near shore areas are potentially out of reach for large marine-based equipment and have implementability issues for both dredging and capping. However, near shore areas can be reached with various types of equipment or by working with the tides. Remediation of shallow areas shall be retained as an essential element of the FS.

55. **(Section 5.2, p. 100):** The preliminary remedial alternative details described in Section 5.2 (including Table 5-4 and Table 5-5) are based on hypothetical values for RALs and SWACs which have not yet been proposed. Upon formal acceptance of the actual proposed values for RALs and SWACs, the specific estimates of areas and volumes of sediment associated with the preliminary sediment management areas (SMAs) (e.g., Table 5-4 and Table 5-5) will be subject to revision.

56. **(Section 5.2, General):** Capping with various cover materials (e.g. EMNR, armor, and coarse grained sediment) shall be considered for various areas to be capped for development in the FS.

57. **(Section 5.2.3, p. 101):** It is not clear from the report how the remediated areas for each post-remedy SWAC were determined. The report shall provide a table showing the polygon areas and the associated average concentration to permit a meaningful review. The polygon locations shall also be identified in a figure(s).

58. **(Section 5.2.4, p. 102):** Near shore areas and areas with structures are not included under this alternative. The report shall discuss why these are not included.

59. **(Section 6.1, p. 108):** The report considers the former draft interim industrial screening level for soils of 950 ng/kg TEQ_{DF}. Following the recent change in the toxicity factor for dioxin, the screening level for industrial exposure is now 665 ng/kg TEQ_{DF}. The report shall be revised to include this new screening level.

60. **(Section 6.2, p. 109):** The sentence describing the remedy selection criteria is incorrect and shall be deleted. All of the CERCLA criteria for remedy selection must be cited. Also in this section, some areas have no deposition or erosion, and natural recovery processes cannot rely on additional sediment to remediate these areas. The report shall clarify this in regards to the time required for further reductions in contamination exposures.

General Comments

61. During earlier discussions on the possibility of using sheet piling as part of the Time Critical Removal Action (TCRA), the concern of causing erosion due to altering the river flow cross-section was raised. The memo shall discuss this issue of potential additional erosion as a result of any alteration of the river cross section resulting from the use of confined disposal facilities.

62. The memo does not provide specific information on the size of the upland area at the site, particularly south of I-10 where there might be opportunities to use the land for staging, sediment dewatering, or soil/sediment ex situ treatment. The memo essentially dismisses use of the land for these purposes, citing the proximity to residences as well as being in a floodplain. It is not clear whether these are fatal flaws for use. In examining Figure 2-18, it's estimated that the southern portion of Area 4a appears to be about 10 acres in size and relatively flat. The memo shall examine the upland property within the site boundary to identify potential for use during the remedial action, or identify fatal flaws or impracticability of land use, which will help to screen technologies.